

## NOTES AND EXTRACTS.

## METEOROLOGY AND THE TEACHERS OF PHYSICS.

The forty-second meeting of the Eastern Association of Physics Teachers was held Saturday, May 20, 1905, at the office of the U. S. Weather Bureau in Boston, Mass., and by adjournment at the meteorological laboratory of Prof. R. DeC. Ward in the museum of Harvard University at Cambridge. At this meeting special attention was given to the teaching of meteorology. Mr. J. W. Smith, District Forecaster, described the Weather Bureau work. Prof. William M. Davis spoke on some problems connected with the circulation of the atmosphere and Prof. R. DeC. Ward discussed Dr. H. Hildebrand Hildebrandsson's views, as follows:

## HILDEBRANDSSON ON THE GENERAL CIRCULATION OF THE ATMOSPHERE.

Professor Ward discussed Dr. H. Hildebrand Hildebrandsson's views regarding the general circulation of the atmosphere. He spoke of the part taken by Doctor Hildebrandsson in proposing a simple scheme of cloud classification in 1887, together with Mr. Ralph Abercromby, and in bringing about the series of international cloud observations which was continued during the so-called international cloud year. With the increasing number of observations of the direction of cloud movement, it has become possible to study much more closely the movements of the atmosphere up to heights of five or six miles, and by means of observations of the drift of *ballons-sondes* and of the dust thrown out by volcanoes, the direction of movement of still higher currents may be determined. Professor Ward summarized the results of Doctor Hildebrandsson's study of the international cloud year observations, and of other available records, as set forth in his "Rapport sur les Observations Internationales des Nuages au Comité International Météorologique. I. Historique: Circulation générale de l'Atmosphère", which has been translated into English by R. G. K. Lempfert and published in the Quarterly Journal of the Royal Meteorological Society for October, 1904, pp. 317-343. The main points in this discussion are as follows:

1. In the vicinity of the equator, in the belt of the equatorial calms, the upper current is from the east throughout the year.
2. Above the trades there are anti-trades, from southwest in the Northern and from northwest in the Southern Hemisphere.
3. These anti-trades extend as far as the polar limits of the trades, but do not pass these limits. Above the tropical high-pressure belts the upper current is from the west, and in these belts the upper current descends to supply the trades.
4. In the temperate zones the atmospheric circulation is a great rotatory movement around the pole. The air in the lower strata approaches the center of the whirl, while that in the upper strata recedes from the center more and more as the altitude increases up to the greatest altitudes from which there are any observations.
5. The upper strata over the temperate latitudes extend over the tropical high-pressure belts and descend there.
6. The upper currents from equator to poles, shown in the views of the general circulation given by Ferrel and James Thomson, do not exist below a level of 10-12 miles, according to Hildebrandsson's results. Hence, he believes that the idea of a vertical circulation between tropics and poles must be given up.

Professor Ward pointed out that the conclusions reached by Doctor Hildebrandsson are deduced directly from observation, and that in this report Doctor Hildebrandsson distinctly states that he has carefully avoided all theories. Many interesting problems remain for future study and solution in connection with the general circulation of the atmosphere, and Doctor Hildebrandsson's report is noteworthy as coming so recently and from so high an authority.

Professor Ward invited the members of the association to inspect the laboratories and to examine the many meteorological charts and diagrams which he uses in his courses and which he had kindly laid out for inspection. After viewing these, many fine lantern slides of tornadoes and their effects, waterspouts, lightning, and other allied meteorological subjects were shown the members and were commented upon by Professor Ward.

## SOUNDING BALLOONS AT ST. LOUIS, MO.

Under date of February 20, 1905, Mr. A. Lawrence Rotch, Director of the Blue Hill Meteorological Observatory, offered the following correction to the Editor's note on page 521 of the MONTHLY WEATHER REVIEW for November, 1904:

It is there said that "the aeronauts of the German Meteorological Office brought to this country for exhibition a very complete collection of balloon apparatus and with this apparatus the officials of the Blue Hill Observatory have made a number of soundings". As a matter of fact, 25 rubber balloons, made in Germany, and 8 instruments, made by M. Teisserenc de Bort of Paris, which were imported by me and paid for by the Department of Liberal Arts of the Exposition, were used in my experiments. It seems only fair to my colleague, M. Teisserenc de Bort, who most courteously supplied me in haste with instruments from his own workshop at cost price, to state that his instruments were used, and to acknowledge my indebtedness to the authorities of the Louisiana Purchase Exposition at St. Louis, who paid some \$1200 in order that I might conduct the first experiments in America with balloons-sondes. The experiments were continued during January and February at my own expense. In the 22 ascensions made, all but one balloon and instrument were recovered. A more detailed account of the work will be found in the journal Science.

## ATMOSPHERIC EXPLORATIONS IN THE TROPICS.

At the request of the Editor Mr. A. Lawrence Rotch communicates the following items with reference to the meteorological expedition to the Tropics now in progress at the joint expense of Mr. Rotch and the French meteorologist, M. Teisserenc de Bort.

Mr. Clayton, of the staff of the Blue Hill Observatory, left Boston by the White Star steamer *Romanic* on June 3 for the Mediterranean. During the voyage he will endeavor to obtain observations of the temperature, moisture, and wind high above the ocean by flying kites lifting self-recording instruments, a method first employed at sea by Mr. Rotch, director of the observatory, during a voyage from Boston to Liverpool four years ago. At Gibraltar Mr. Clayton will embark on the steam yacht *Otaria*, belonging to M. Teisserenc de Bort, the French meteorologist, who has equipped her for kite-flying.

At the joint expense of the owner and of Mr. Rotch, the *Otaria* will proceed along the African coast nearly to the equator, and return by the Azores, making frequent soundings of the atmosphere by means of kites and balloons. The trade winds and doldrums will thus be traversed, and it is hoped that the meteorological conditions prevailing above them, which are practically unknown, will be at least partially revealed. The voyage is expected to last about six weeks.

A despatch received June 10 from Mr. Clayton at the Azores states that during the six days' voyage of the *Romanic* thither four kite flights were made to a height of five-eighths of a mile or more. Aerial soundings within the region of high barometric pressure over this part of the Atlantic have never been made heretofore and are expected to give interesting results.

## ATMOSPHERIC ELECTRICITY.

The various difficulties attending the measurement of atmospheric electricity and the details of the best methods of the present time are briefly mentioned in the English journal *Nature*, May 25, 1905, in an article by Mr. George C. Simpson, who concludes as follows:

These and other difficulties have been so recently recognized and overcome that trustworthy results have as yet hardly been obtained, but the observations appear to justify the following conclusions:

(1) The normal potential gradient remains positive to the highest point yet investigated (5900 meters by Gerdien), but decreases in magnitude as the height increases. This points to the lower regions of the atmosphere containing a positive charge equal to the negative charge on the earth's surface, so that the globe as a whole is not charged.

(2) The number of ions in a cubic meter of air is the same at all heights.

(3) Electricity is dissipated more rapidly from a charged body the higher it is in the atmosphere, this being, no doubt, due to the greater ease with which ions move in rarefied air.

These results require further verification before they can be accepted as final, and it is to be hoped that facilities will be forthcoming for the investigations to be followed up in this country.

## APPOINTMENT OF THE SOLICITOR OF THE DEPARTMENT OF AGRICULTURE.

In accordance with General Order No. 85, dated June 17, 1905, Mr. Geo. P. McCabe has been appointed Solicitor of the Department of Agriculture, to take effect July 1, 1905. He will act as the legal adviser of the Secretary, and is charged with the preparation and supervision of all legal papers to